

## **REMARKS**

Claims 13-22 are now pending in the application. The Examiner is respectfully requested to consider the amendments and remarks contained herein.

## **EXPEDITED PROCEDURE**

Applicant respectfully calls the Examiner's attention to the fact that the claims filed herein are of equivalent scope to those examined in the parent application and do not add new matter. Therefore the application has one effective filing date that corresponds to the filing date of the parent application. As a result, the Examination of the application should be expedited on the basis of the effective filing date.

## **REJECTIONS IN THE PARENT APPLICATION**

In response to the Office Action mailed March 26, 2003 in relation to the parent application, please consider the remarks set forth below.

## **REJECTION UNDER 35 U.S.C. § 112**

Claims equivalent to those filed in the present application previously stood rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. This rejection is respectfully traversed.

The Examiner has indicated indefiniteness in the claims stemming from inconsistent usage of plural and singular forms. In particular, the Examiner has

indicated non-agreement between a plural subject "layers" and singular verbs "functions", "is", "includes", and "has".

Applicant regrets the error in conjugation, and has amended each of the pending claims wherever appropriate to remove confusion and provide the definite language that particularly points out and distinctly claims the subject matter which Applicant regards as the invention. Therefore, Applicant respectfully requests that the rejection under 35 U.S.C. §112, second paragraph, not be asserted against the present claims which particularly point out and distinctly claim the subject matter which Applicant regards as the invention.

#### **REJECTION UNDER 35 U.S.C. § 102**

Claims equivalent to those filed in the present application previously stood rejected under 35 U.S.C. §102(b) as being unpatentable over Suzuki (JP. 5-13446). This rejection is respectfully traversed.

According to the present invention, the thickness of the first semiconductor layers is at least 10 nm or at most 100 nm. However according to the previously cited reference, the thickness of the i-GaAs layer, which corresponds to the first semiconductor layers of the present invention, is 6nm (see [0013] of cited reference 1).

In the Response to Argument of the Final Office Action to the parent application, the Examiner asserts:

"Suzuki clearly states that delta doped-layers 151 to 155, which are constituted by doping Si to the surface of these layers 141 to 146 (emphasis added) (abstract). Accordingly, because delta doped-layers 151 to 155 are formed by doping Si to the

surfaces of GaAs layers 141 to 146, the delta doped-layers 151 - 155 would be composed of Si and GaAs”.

However, although the English-translation of the abstract of the cited reference states that “the delta doped-layers 151 - 155 are constituted by doping Si to the surfaces of these layers 141 to 146,...” this does not teach that the delta doped-layers 151-155 are composed of Si doped GaAs. In fact, the delta doped-layers are composed of Si doped As, as the remainder of the reference explains. In this regard, Applicants are herewith furnishing an additional copy of the partial translation of the cited reference. For the Examiner’s additional reference, the cited reference was also discussed in detail in response to the first Office Action in the parent case. Relevant portions of that response will be included below.

As described in the Remarks of the first Office Action and reiterated here, according to the content of the cited reference, the Applicants respectfully point out that the delta doped-layers 151 - 155 of the cited reference 1 are composed of Si and As, and are not composed of Si and GaAs. Thus the Examiner’s reading of the cited portions of the Abstract are not accurate (“...doping Si to the surfaces of these layers...” does not mean that layers 151 to 155 are composed of GaAs).

To see that this is so, refer to paragraphs [0013] - [0014] of the cited reference, for which translation has been provided. The i-GaAs layer 141, being 6nm in thickness, is described as not doped by impurities. It is deposited on a barrier layer 13. Thereafter, the shutter of a Ga vaporizer, which is opened due to the process of depositing the i-GaAs layer 141, is closed, and at the same time or after a few seconds, the shutter of a Si vaporizer is opened for 60 seconds to deposit a Si doping layer 151, such that one  $\delta$

doped layer is deposited. Next, the shutter of the Si vaporizer is closed and the shutter of the Ga vaporizer is opened to deposit a 6nm i-GaAs layer 142. This process is repeated until all the i-GaAs layers 141 - 145 (14) not doped by impurities and the Si doping layers 151 - 155 (15) are alternately deposited to form a multilayer structure.

Since after depositing the 6nm i-GaAs layer 141, the shutter of the Ga vaporizer is closed and the shutter of the Si vaporizer is opened to deposit the Si doping layer 151, the Si doping layer 151 is composed of Si and As and does not include Ga (i.e. it is not GaAs). It is respectfully submitted that, in view of what this reference actually teaches, the Examiner's reading of the Abstract as a teaching of the Applicants' invention is not accurate and cannot serve as a basis for rejection of the present claims.

Applicant's respectfully request that the Examiner refrain from reasserting the rejection in the present application in view of these significant differences.

### **REJECTION UNDER 35 U.S.C. § 103**

Claims equivalent to those filed in the present application previously stood rejected under 35 U.S.C. §103 as being unpatentable over Suzuki (JP. 5-13446) in view of Hiroyuki et al. (JP. 06-349860). This rejection is respectfully traversed.

Applicant's respectfully direct the Examiner's attention to the remarks provided above with reference to rejection under 35 U.S.C. 102.

### **CONCLUSION**

It is believed that all of the stated grounds of rejection in the parent case have been properly traversed, accommodated, or rendered moot. Applicant therefore

respectfully requests that the Examiner consider the present application is in condition for allowance. Thus, prompt and favorable consideration of this amendment is respectfully requested. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (248) 641-1600.

Respectfully submitted,

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